DETAILED ACTION

1. Claims 1 – 18 are pending in this application.

Claim Objections

2. The following claims are objected to for a lack of antecedent basis.

(a) Claims 3, 9, and 15 contain the limitation "said other sub-operations."

(b) Claims 5, 11 and 17 contain the limitation "the Barnes-Hut operation."

3. The following claims are objected to for grammatical errors.

(a) Claims 2, 8, and 14 states "wherein said task is one of plurality of repeatable operations."

Claim Rejections - 35 USC § 103

4. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

5. Claims 1-3, 6, 8-9, and 12-15 are rejected under 35 U.S.C. 103(a) as being unpatentable over Verbeke et al. (Pre-Grant Publication No. US 2004/0098447 A1), hereinafter Verbeke, in view of Penev et al. (EP 1246123 A2), Hereinafter Penev.

6. With respect to claim 1, Verbeke teaches a manager for use in a system of grid computing (0136, lines 1-12, where the task dispatcher is the task manager) comprising a processor operable to define a computing task based on data received by said processor, said processor further operable to assign a portion of said task to each of a plurality of clients connected to said manager via a network (0136, lines 11-12, where the workers are connected to the task dispatcher via the network), said processor handling client failure and carrying on with its process (0183, lines 7-13). But Verbeke doesn't teach being further operable to approximate a result of said portion and return said result to said manager. However, Penev does teach approximating a result of said portion and return said result to said manager (Abstract, lines 1-3 teaches that the context of the device is image processing; 0031, lines 1-4, where the device will use the information from the last construct to approximate the result of a future construct).

It would have been obvious to a person of ordinary skill, in the art at the time of the invention, to modify the teachings of Verbeke, in order to use data approximation, as taught by Penev, as a method of overcoming failure to deliver result. Doing so would provide an efficient procedure of correcting errors due to failure when using the Verbeke device to perform the sorts of calculations implemented by the applicant’s device.

7. As for claim 2, Verbeke teaches wherein said task is one of plurality of repeatable operations, said task including a plurality of sub-operations (0136, lines 1-12, repeatable operations are anticipated because there is nothing to stop a task from occurring more than once and with respect to sub-operations, by the nature of grid

computing, a single operation is broken down into smaller operations to be carried out by the nodes on the grid), and wherein an approximation of said sub-operation introduces a predefined accepted level of error to a performance of said task (0008, lines 7-10, it is inherent that if there is a fault tolerance, then there must be an associated pre-determined tolerance level).

9. As for claim 3, Verbeke teaches wherein said sub-operations can be applied substantially independently of said other sub-operations (0088, lines 11-16).

10. With respect to claim 6, Verbeke teaches a method of grid computing comprising the steps of: receiving data respective to a computing task; defining said task based on said received data; assigning a portion of said task to each of a plurality of clients based on said defining step (0136, lines 1-12, all of the above mentioned steps are taking place); awaiting receipt of results of said portions from said clients (0141, lines 8-10). Verbeke also teaches handling node failures (0183, lines 7-13) But Verbeke doesn't teach approximating said results for any clients where said results are not received; compiling said received results and said approximated results; and, outputting said results in a pre-defined format.

However, Penev does teach approximating said results for any clients where said results are not received; compiling said received results and said approximated results (0031, lines 1-4, where the device will use the information from the last construct to approximate the result of a future construct); and, outputting said results in a pre-

defined format (it is inherent that a computer system outputs data in a predefined format. For example: binary code).

11. As for claim 8, Verbeke teaches wherein said task is one of plurality of repeatable operations, said task including a plurality of sub-operations (0136, lines 1-12, repeatable operations are anticipated because there is nothing to stop a task from occurring more than once and with respect to sub-operations, by the nature of grid computing, a single operation is broken down into smaller operations to be carried out by the nodes on the grid), and wherein an approximation of said sub-operation introduces a predefined accepted level of error to a performance of said task (0008, lines 7-10, it is inherent that if there is a fault tolerance, then there must be an associated pre-determined tolerance level).

12. As for claim 9,Verbeke teaches wherein said sub-operations can be applied substantially independently of said other sub-operations (0088, lines 11-16).

13. With respect to claim 12, Verbeke teaches a system of grid computing (0013, lines 1-3) comprising: a manager operable to define a computing task and assign a portion of said task to each of a plurality of clients connected to said manager via a network (0136, lines 1-12). But Verbeke doesn’t teach said manager further operable to approximate a result of said portion if said client fails to return said result to said manager. However, Penev does teach said manager further operable to approximate a

result of said portion if said client fails to return said result to said manager. It would have been obvious to a person of ordinary skill, in the art at the time of the invention, to modify the teachings of Verbeke, in order to use data approximation, as taught by Penev, as a method of implementing error correction due to failure. Doing so would provide an efficient procedure of correcting errors when using the Verbeke device to perform the sorts of calculations implemented by the applicant's device.

14. With respect to claim 13, Verbeke teaches a computer-readable medium (figure 19 shows the software architecture that carries out the processes of Verbeke's device) comprising a plurality of computing instructions for a manager connectable to a plurality of clients via a network (0136, lines 1-12), said computing instructions for defining a computing task and assigning a portion of said task to each of said clients (0136, lines 11-12). But Verbeke doesn't teach said instructions including steps for approximating a result of said portion if said client fails to return said result to said manager.

However, Penev teaches such a system (0031, lines 1-4). It would have been obvious to a person of ordinary skill, in the art at the time of the invention, to modify the teachings of Verbeke, in order to use data approximation, as taught by Penev, as a method of implementing error correction due to failure. Doing so would provide an efficient procedure of correcting errors when using the Verbeke device to perform the sorts of calculations implemented by the applicant's device.

15. As for claim 14, Verbeke teaches wherein said task is one of plurality of repeatable operations, said task including a plurality of sub-operations (0136, lines 1-12, repeatable operations are anticipated because there is nothing to stop a task from occurring more than once and with respect to sub-operations, by the nature of grid computing, a single operation is broken down into smaller operations to be carried out by the nodes on the grid), and wherein an approximation of said sub-operation introduces a predefined accepted level of error to a performance of said task (0008, lines 7-10, it is inherent that if there is a fault tolerance, then there must be an associated pre-determined tolerance level).

16. As for claim 15,Verbeke teaches wherein said sub-operations can be applied substantially independently of said other sub-operations (0088, lines 11-16).

17. Claims 4-5, 7, 10-11, and 16-18 are rejected under 35 U.S.C. 103(a) as being unpatentable over Verbeke, in view of Penev, and in further view of Aridor et al. (Pre-Grant Publication No. US 2002/0038301 A1), hereinafter Aridor.

18. As for claim 4, it is rejected on the same basis as claim 3 above. However, the combination of Verbeke and Penev do not disclose wherein said task is an n-body type problem. Aridor teaches wherein said task is an n-body type problem (0258, lines 1-7). It would have been obvious to a person of ordinary skill, in the art at the time of the invention, to modify the teachings of Verbeke and Penev, in order to perform n-body

problems, as taught by Aridor. Calculating n-body type problems was one of the vast uses for computer technology that was available at the time of the invention.

19. As for claim 5, it is rejected on the same basis as claim 4 above. In addition, Aridor teaches wherein said n-body type problem is performed using the Barnes-Hut operation (0269, lines 1-4).

20. As for claim 7, it is rejected on the same basis as claim 6 above. However, the combination of Verbeke and Penev do not disclose the additional step of, prior to said outputting step, of repeating all foregoing steps until a desired level of performance of said task is achieved. Aridor teaches the additional step of, prior to said outputting step, of repeating all foregoing steps until a desired level of performance of said task is achieved (0269, lines 1-4, It is the purpose of the Barnes-Hut algorithm to perform multiple steps of reducing grid size of the algorithmic squares in order to find the desired position). It would have been obvious to a person of ordinary skill, in the art at the time of the invention, to modify the teachings of Verbeke and Penev, in order to perform n-body problems, as taught by Aridor. Calculating n-body type problems was one of the vast uses for computer technology that was available at the time of the invention.

21. As for claim 10, it is rejected on the same basis as claim 9 above. However, the combination of Verbeke and Penev do not disclose said task is an n-body type problem. Aridor teaches wherein said task is an n-body type problem (0258, lines 1-7). It would

have been obvious to a person of ordinary skill, in the art at the time of the invention, to modify the teachings of Verbeke and Penev, in order to perform n-body problems, as taught by Aridor. Calculating n-body type problems was one of the vast uses for computer technology that was available at the time of the invention.

22. As for claim 11, it is rejected on the same basis as claim 10. In addition, Aridor teaches wherein said n-body type problem is performed using the Barnes-Hut operation (0269, lines 1-4).

23. As for claim 16, it is rejected on the same basis as claim 14 above. However, the combination of Verbeke and Penev do not disclose said task is an n-body type problem. Aridor teaches wherein said task is an n-body type problem (0258, lines 1-7). It would have been obvious to a person of ordinary skill, in the art at the time of the invention, to modify the teachings of Verbeke and Penev, in order to perform n-body problems, as taught by Aridor. Calculating n-body type problems was one of the vast uses for computer technology that was available at the time of the invention.

24. As for claim 17, it is rejected on the same basis as claim 16 above. In addition, Aridor teaches wherein said n-body type problem is performed using the Barnes-Hut operation (0269, lines 1-4).

25. As for claim 18, it is rejected on the same basis as claim 13 above. However, the combination of Verbeke and Penev do not disclose said task is selected from the group consisting of determining a) movements of masses in a given space; b) charges of particles; c) electromagnetic fields; d) fluid dynamics in a fluid system; e) weather patterns; f) equity fluctuations in financial markets; and g) movements of objects in multi-player games.

Aridor teaches wherein said task is selected from the group consisting of determining a) movements of masses in a given space; b) charges of particles; c) electromagnetic fields; d) fluid dynamics in a fluid system; e) weather patterns; f) equity fluctuations in financial markets; and g) movements of objects in multi-player games (0269, lines 1-4, where the simulated motion of particles in a two-dimensional space due to gravitational forces is movements of masses in a given space).

It would have been obvious to a person of ordinary skill, in the art at the time of the invention, to modify the teachings of Verbeke and Penev, in order to perform n-body problems, as taught by Aridor. Calculating n-body type problems was one of the vast uses for computer technology that was available at the time of the invention.

Conclusion

26. Any inquiry concerning this communication or earlier communications from the examiner should be directed to JOSEPH L. GREENE whose telephone number is (571)270-3730. The examiner can normally be reached on Monday - Thursday from 8:00 AM to 4:30 PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Nabil El-Hady can be reached on (571) 272-3963. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

JLG

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